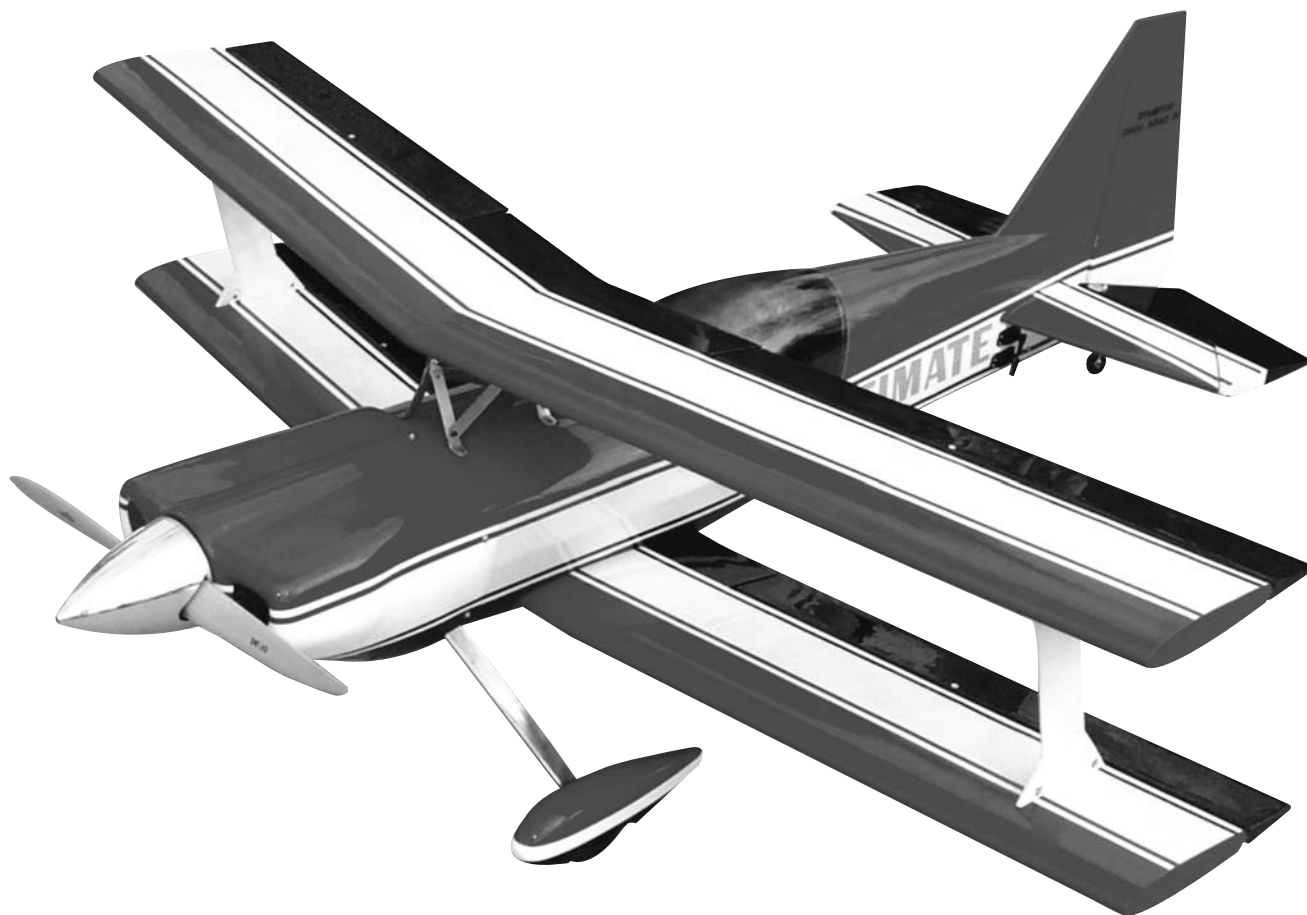


30%

Ultimate

10-300



CARL GOLDBERG PRODUCTS, LTD.

P.O. Box 818 Oakwood, GA 30566 Phone # 678-450-0085 www.carlgoldbergproducts.com

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30% ULTIMATE ARF

WARNING! THIS IS NOT A TOY! THIS IS NOT A BEGINNERS AIRPLANE

THIS R/C KIT AND THE MODEL YOU WILL BUILD FROM IT IS NOT A TOY! IT IS CAPABLE OF SERIOUS BODILY HARM AND PROPERTY DAMAGE. IT IS YOUR RESPONSIBILITY, AND YOURS ALONE - TO BUILD THIS KIT CORRECTLY, PROPERLY INSTALL ALL R/C COMPONENTS AND FLYING GEAR (ENGINE, TANK, RADIO, PUSHRODS, ETC.) AND TO TEST THE MODEL AND FLY IT ONLY WITH EXPERIENCED, COMPETENT HELP, USING COMMON SENSE AND IN ACCORDANCE WITH ALL SAFETY STANDARDS AS SET FORTH IN THE ACADEMY OF MODEL AERONAUTICS SAFETY CODE. IT IS SUGGESTED THAT YOU JOIN THE AMA AND BECOME PROPERLY INSURED BEFORE ATTEMPTING TO FLY THIS MODEL. IF YOU ARE JUST STARTING R/C MODELING, CONSULT YOUR LOCAL HOBBY DEALER OR WRITE TO THE ACADEMY OF MODEL AERONAUTICS TO FIND AN EXPERIENCED INSTRUCTOR IN YOUR AREA.

WRITE TO: ACADEMY OF MODEL AERONAUTICS, 5151 MEMORIAL DR. MUNCIE, IN 47302

LIMITED WARRANTY

CARL GOLDBERG PRODUCTS IS PROUD OF THE CARE AND ATTENTION THAT GOES INTO THE MANUFACTURE OF PARTS FOR ITS MODEL KITS. THE COMPANY WARRANTS THAT FOR A PERIOD OF 90 DAYS, IT WILL REPLACE, AT THE BUYERS REQUEST, ANY PART OR MATERIAL SHOWN TO THE COMPANY'S SATISFACTION TO HAVE BEEN DEFECTIVE IN WORKMANSHIP OR MATERIAL AT THE TIME OF PURCHASE.

NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, IS MADE WITH RESPECT TO THE MERCHANDISE SOLD BY THE COMPANY. THE BUYER ACKNOWLEDGES AND UNDERSTANDS THAT HE IS PURCHASING ONLY A COMPONENT KIT FROM WHICH THE BUYER WILL HIMSELF CONSTRUCT A FINISHED FLYING MODEL AIRPLANE. THE COMPANY IS NEITHER THE MANUFACTURER OF SUCH A FLYING MODEL AIRPLANE, NOR A SELLER OF IT. THE BUYER HEREBY ASSUMES THE RISK AND ALL LIABILITY FOR PERSONAL OR PROPERTY DAMAGE OR INJURY ARISING OUT OF THE BUYERS USE OF THE COMPONENTS OR THE FINISHED FLYING MODEL AIRPLANE, WHENEVER ANY SUCH DAMAGE OR INJURY SHALL OCCUR.

ANY ACTION BROUGHT FORTH AGAINST THE COMPANY, BASED ON THE BREACH OF THE CONTRACT OF SALE TO THE BUYER, OR ON ANY ALLEGED WARRANTY THERE UNDER, MUST BE BROUGHT WITHIN ONE YEAR OF THE DATE OF SUCH SALE, OR THERE AFTER BE BARRED. THIS ONE-YEAR LIMITATION IS IMPOSED BY AGREEMENT OF THE PARTIES AS PERMITTED BY THE LAWS OF THE STATE OF GEORGIA.

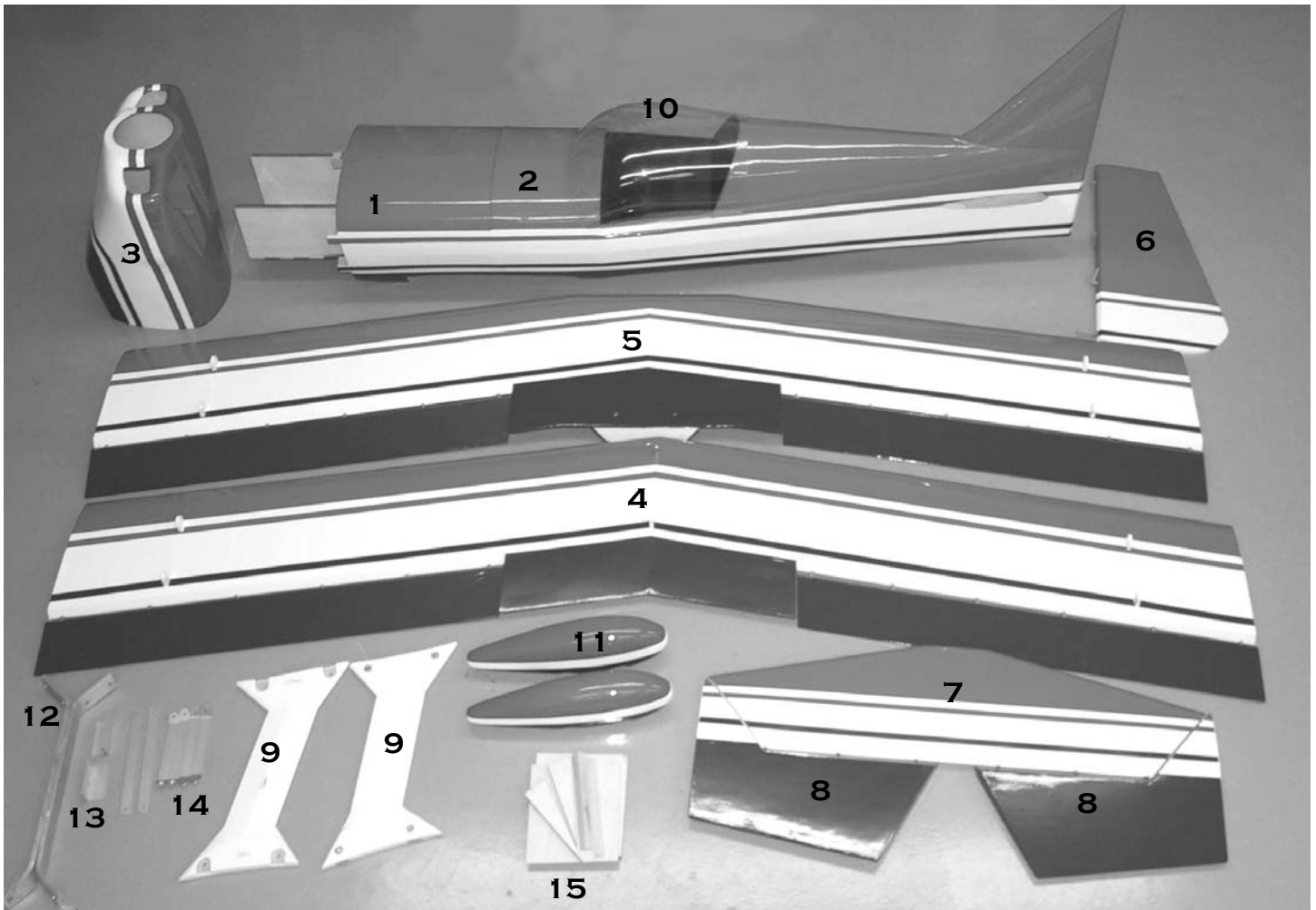
IMPORTANT INFORMATION

COVERING COMING LOOSE IS NOT COVERED UNDER WARRANTY. DUE TO TEMPERATURE CHANGES THE PLANE MAY DEVELOP SOME WRINKLES IN THE COVERING THAT YOU WILL NEED TO REMOVE WITH AN IRON. BE SURE TO SEAL THE EDGES DOWN FIRST SO THAT YOU DO NOT CAUSE THE COVERING TO SHRINK AND LEAVE EXPOSED AREAS OF WOOD. PLEASE INSPECT THE PLANE BEFORE BEGINNING TO ASSEMBLE TO MAKE SURE YOU ARE HAPPY WITH IT. AFTER ASSEMBLY HAS BEGUN YOU CANNOT RETURN THE KIT. IF YOU FIND A PROBLEM BEFORE BEGINNING TO ASSEMBLE THE PLANE YOU MUST CONTACT US, PLEASE DO NOT RETURN IT TO THE DEALER.

30% ULTIMATE ARF **30% ULTIMATE ARF 3-D ARF**

CONGRATULATIONS ON YOUR PURCHASE OF THE GOLDBERG ULTIMATE ARF 3-D ARF. THIS IS A VERY UNIQUE AIRCRAFT, WITH GREAT 3-D CAPABILITIES. EVERY EFFORT HAS BEEN MADE TO PRODUCE A LIGHTWEIGHT, STRAIGHT, EASY TO ASSEMBLE AIRCRAFT. BECAUSE OF ITS OVERSIZE CONTROL SURFACES WHICH ARE DOUBLE BEVELED TO ALLOW FOR EXTREME THROWS, GREAT CARE MUST BE TAKEN IN THE SET-UP AND FLYING OF THIS AIRPLANE. QUALITY HARDWARE COMPONENTS HAVE BEEN PROVIDED TO ALLOW FOR 3D SET-UP WHILE MAINTAINING ADEQUATE MECHANICAL ADVANTAGE TO ELIMINATE FLUTTER. IT IS YOUR RESPONSIBILITY AS AN ADVANCED PILOT TO FLY THE AIRCRAFT IN AN INTELLIGENT MANNER. THROTTLE MANAGEMENT IS A MUST!!!!!!! WE AT CARL GOLDBERG HAVE PUT THE 30% ULTIMATE ARF THROUGH A VERY RIGOROUS FLIGHT-TESTING SCHEDULE AND HAVE STRESSED THE AIRFRAME BEYOND ALL PRACTICAL PARAMETERS WITHOUT A SINGLE FAILURE. CARL GOLDBERG WILL NOT WARRANT THE ULTIMATE ARF AGAINST FLUTTER DUE TO IMPROPER SET-UP OR EXCESSIVE SPEED MANEUVERS. HAVING SAID THAT, WE BELIEVE YOU WILL FIND THE ULTIMATE ARF TO BE ONE OF THE MOST RESPONSIVE, IN-THE-GROVE AIRCRAFT ON THE MARKET. THE ULTIMATE ARF EXCELS AT HIGH-ALPHA MANEUVERS INCLUDING HARRIERS (BOTH UPRIGHT AND INVERTED), HIGH-ALPHA ROLLS, AND HIGH-ALPHA KNIFE EDGE. TORQUE ROLLS, WATERFALLS, KNIFE EDGE LOOPS AND ELEVATORS ARE ALL WITHIN THE PERFORMANCE PARAMETERS OF THIS UNIQUE AIRCRAFT. JUST REMEMBER TO USE COMMON SENSE WHEN FLYING THIS HIGH PERFORMANCE MACHINE.

PARTS LAYOUT



1.FUSELAGE

2.REMOVABLE COCKPIT

3.COWL

4.TOP WING

5.BOTTOM WING

6.RUDDER

7.STABILIZER

8.ELEVATOR (2)

9.I-STRUTS (2)

10.CLEAR CANOPY

11.WHEEL PANTS (2)

12.LANDING GEAR (2)

13.ALUMINUM ANGLES (2)

14.CABANE STRUTS (6) PCS.

15.FIREWALL

**16.HARDWARE BAG (NOT
SHOWN)**

30% ULTIMATE ARF

HARDWARE LIST	QUANTITY PER KIT	USE
6-32x3/4" SOCKET HEAD SCREWS	20	2 CANOPY HOLD DOWN 8 I-STRUTS 4 CABANE STRUTS AT FUSELAGE 2 TOP WING MOUNT AT CABANE 4 LANDING GEAR ALUMINUM ANGLES
6-32x1/2" SOCKET HEAD SCREWS	6	4 CABANE STRUT BRACES 2 WHEEL PANT MOUNTS
6-32 LOCK NUTS	6	4 CABANE STRUTS 2 TOP WING MOUNT
6-32 BLIND NUTS	2	WHEEL PANT MOUNT
6-32x 3/4" SHEET METAL SCREWS	2	TAIL WHEEL MOUNT
6-32x 1/2" SHEET METAL SCREWS	5	COWL MOUNT
1/4-20x1-1/2" SOCKET HEAD SCREW	4	LANDING GEAR MOUNTS
1/4-20x1" SOCKET HEAD SCREWS	2	LOWER WING MOUNT
1/4-20 LOCK NUTS	4	LANDING GEAR MOUNT
1/4" FLAT WASHERS	4	LANDING GEAR MOUNT
TAIL WHEEL ASSEMBLY	1	
TAIL WHEEL	1	
TAIL WHEEL TILLER SPRING	1	
1/8" WHEEL COLLARS	2	
SET SCREWS	2	
3/16" AXLES	2	
AXLE NUTS	2	
3/16" WHEEL COLLARS	4	
SET SCREWS	4	
4" WHEELS	2	
6-32x2" FLAT HEAD SCREWS	6	4 AILERON HORNS 2 ELEVATOR HORNS
6-32x3" THREADED ROD	1	RUDDER HORN
6-32 NUTS	12	4 AILERON HORNS 2 ELEVATOR HORNS 4 LANDING GEAR ALUMINUM ANGLES 2 RUDDER HORN

30% ULTIMATE ARF

#6 FLAT WASHERS	17	8 CONTROL HORNS 4 LANDING GEAR ALUMINUM ANGLES 5 COWL MOUNT
4-40 GOLDEN CLEVIS	16	8 AILERON 4 ELEVATOR 4 RUDDER
4-40 JAM NUTS	16	
CLEVIS RETAINERS	16	
EZ CONNECTOR BODY	1	THROTTLE
SCREW	1	
SNAP NUT	1	
2-56x12" THROTTLE PUSH ROD	1	
NYLON SNAP LINK	1	THROTTLE
4-40x2-1/8" PUSHROD	4	AILERONS
4-40x5" PUSHRODS	2	ELEVATORS
4-40x7-1/2" PUSHRODS	2	RUDDER
24 OZ TANK-GASOLINE	1	
14" TIE WRAPS	2	FUEL TANK MOUNT
LASER CUT TANK MOUNT	1	
3/8" SQ X 1" SPRUCE BLOCK	2	THROTTLE SERVO MOUNT
LASER CUT THROTTLE SERVO MOUNT	1	
GOLDBERG HORN BKTS	10	4 AILERON HORNS 2 ELEVATOR HORNS 2 RUDDER HORNS 2 TAIL WHEEL STEERING
#4 x 1/2" SHEET METAL SCREWS	10	MOTOR BOX COVER
#4 FLAT WASHERS	10	MOTOR BOX COVER
1/8" DOWEL X 12"	1	FIREWALL PINS

BUILDING INSTRUCTIONS

BEFORE STARTING TO BUILD THIS KIT, WE URGE YOU TO READ THROUGH THESE INSTRUCTIONS. THEY CONTAIN SOME IMPORTANT BUILDING SEQUENCES AS WELL AS INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THE MODEL.

WE EXPECT THAT YOU HAVE SOME BUILDING EXPERIENCE TO TAKE ON THIS MODEL. THIS MEANS, EVERY MINUTE DETAIL IS NOT COVERED. THIS IS NOT A BASIC TRAINER. THE INSTRUCTIONS TOGETHER WITH THE SIMPLICITY OF THIS KIT WILL ALLOW YOU TO PRODUCE A FIRST CLASS ULTIMATE .

BUILDING SUPPLIES NEEDED

HOBBY KNIFE W/ #11 BLADE

THIN ZAP CA

30 MINUTE Z-POXY

THREAD LOCK

WIRE CUTTERS

PLIERS

**DRILL WITH BITS: 1/8", 5/32", 5/64"
9/64"**

PHILLIPS AND STANDARD SCREWDRIVER

SMALL CLAMPS

MASKING TAPE

TAPE MEASURE

WASHABLE MARKER

PAPER TOWELS

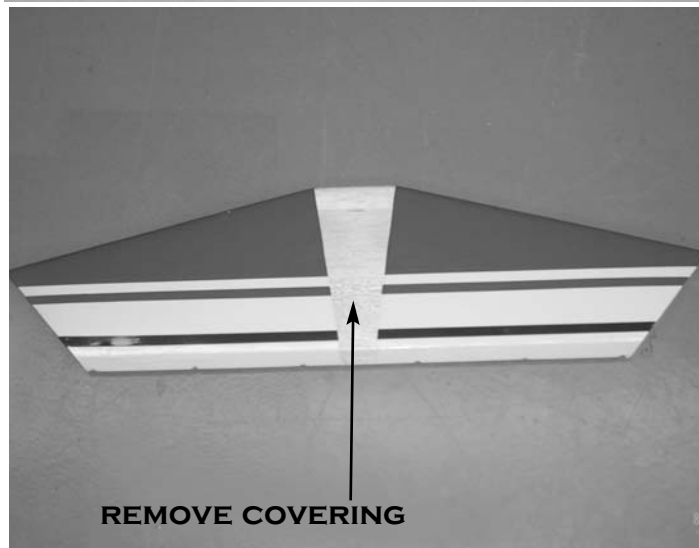
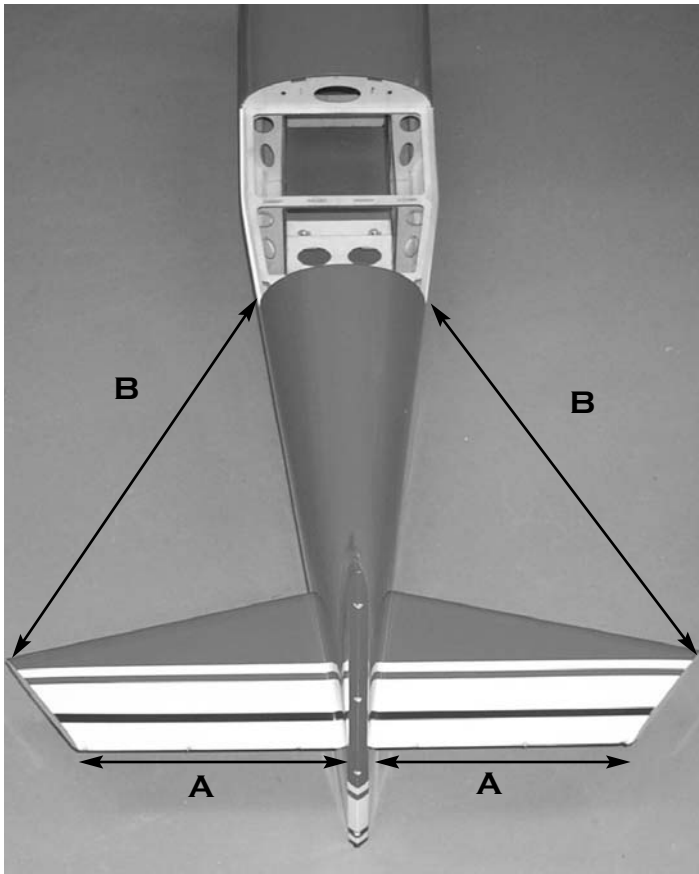
RUBBING ALCOHOL

BEGIN CONSTRUCTION BY LOCATING THE TWO 1/4-20 X 1" SOCKET HEAD BOLT USED TO BOLT THE BOTTOM WING ON. PUT THE BOTTOM WING IN PLACE AND REMOVE THE COVERING OVER THE MOUNT HOLES AT THE TRAILING EDGE. BOLT THE WING DOWN. NEXT LOCATE THE STABILIZER AND FIT INTO OPENING IN FUSELAGE. CHECK ALIGNMENT WITH WING, IT SHOULD BE PARALLEL WHEN SIGHTED FROM THE REAR. IT SHOULD NOT BE NECESSARY TO REMOVE ANY MATERIAL TO ACHIEVE ALIGNMENT, SIMPLY PUSHING UP OR DOWN ON ONE TIP SHOULD DO IT. IF NECESSARY REMOVE MATERIAL FROM THE BOTTOM OF THE STAB SADDLE ON ONE SIDE TO ACHIEVE ALIGNMENT.



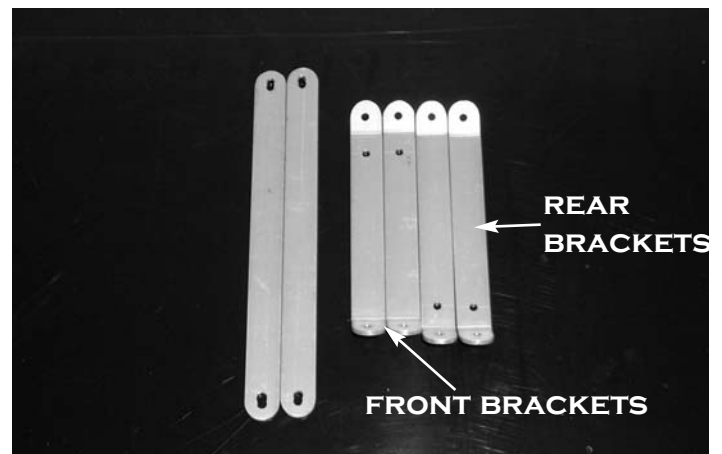
30% ULTIMATE ARF

WHEN SATISFIED WITH THE ALIGNMENT, MEASURE TO MAKE SURE THE STAB IS SQUARE AND CENTERED. MEASUREMENT A SHOULD BE THE SAME ON BOTH SIDES AND MEASUREMENT B SHOULD BE THE SAME ON BOTH SIDES. WHEN STAB IS ALIGNED, USE A MARKER AND DRAW A LINE ON TOP AND BOTTOM OF THE STAB, ON BOTH SIDES NEXT TO THE FUSELAGE.



REMOVE THE STAB AND USING A SHARP #11 BLADE, CUT THE COVERING ABOUT 1/8" INSIDE THE LINE YOU DREW AND REMOVE THE COVERING. BE CAREFUL AND DO NOT CUT TOO DEEP AND CUT INTO THE BALSA AS THIS WILL WEAKEN THE STAB. DO THIS TOP AND BOTTOM. CHECK THE STAB SADDLE IN THE FUSELAGE AND REMOVE THE COVERING WHERE THE STAB WILL BE SITTING. MIX SOME 30 MINUTE EPOXY AND APPLY TO THE BARE WOOD ON THE STABILIZER WHERE YOU REMOVED THE COVERING. SLIDE THE STAB BACK INTO THE FUSELAGE AND ALIGN USING THE MARKS YOU MADE. USE MASKING TAPE PULLED TO THE TOP OF THE FIN AND BOTTOM OF THE FUSELAGE TO HOLD PARALLEL TO WING. USE RUBBING ALCOHOL AND PAPER TOWELS TO CLEAN UP THE EXCESS EPOXY. RECHECK YOUR ALIGNMENT AND SET ASIDE TO DRY.

TOP WING MOUNTING



LOCATE THE ALUMINUM BRACKETS THAT MAKE UP THE CABANE STRUTS. IT CONSIST OF SIX PIECES. THE TWO LONG STRAIGHT PIECES ARE THE DIAGONAL SUPPORTS. THE TWO LONGER OF THE PIECES WITH ANGLES GO TO THE REAR AND THE TWO SHORTER ONES GO TO THE FRONT. THE SHARPER OF THE TWO ANGLES ARE THE BOTTOM OF THE STRUT.

30% ULTIMATE ARF



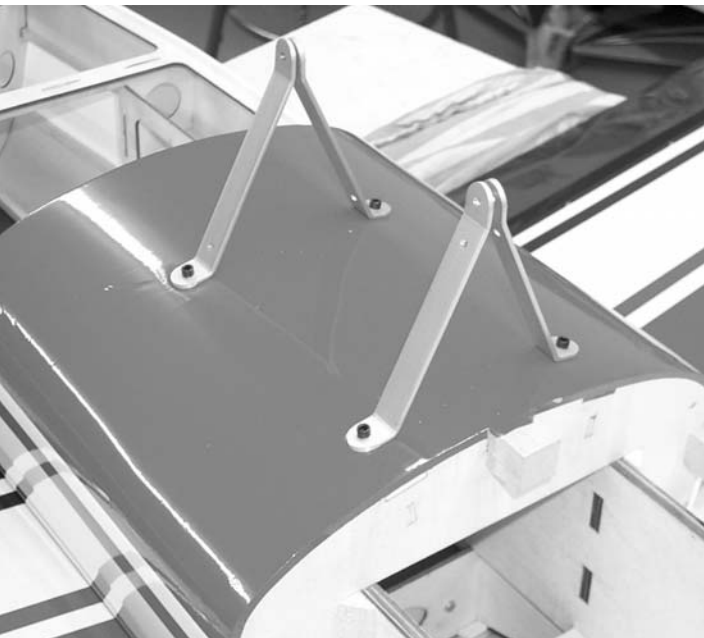
LOCATE THE TWO I-STRUTS AND THE EIGHT 6-32x3/4" SOCKET HEAD CAP SCREWS. THE I-STRUTS ARE IDENTIFIED LEFT AND RIGHT, TOP AND BOTTOM WITH SMALL STICKERS.

TAKE A STRAIGHT PIN AND STICK THROUGH THE BLIND NUT INSIDE THE FUSELAGE TO LOCATE THE HOLES FOR THE STRUTS.

USING THE FOUR 6-32x3/4" SOCKET HEAD CAP SCREWS, MOUNT THE STRUTS TO THE TOP OF THE FUSELAGE, SHORT ONES IN FRONT LONGER ONES IN REAR. DO NOT TIGHTEN THE SCREWS DOWN TIGHT AT THIS TIME. LEAVE THEM LOOSE UNTIL THE TOP WING IS MOUNTED.



FIT THE TABS ON THE TOP WING BETWEEN THE BRACKETS FRONT AND REAR AND INSTALL A 6-32x3/4" SOCKET HEAD CAP SCREW THROUGH THE HOLES. DO NOT INSTALL NUTS NOW.

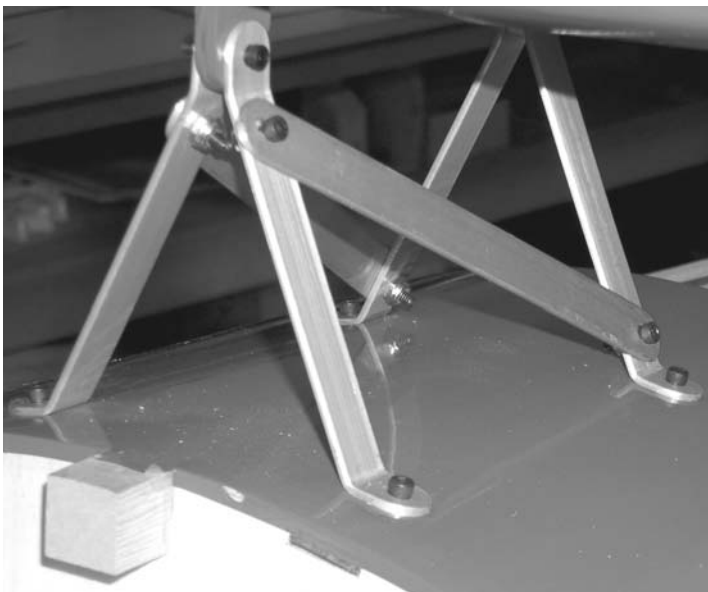


30% ULTIMATE ARF



WITH THE I-STRUTS SCREWED IN PLACE, INSTALL THE NUTS ON THE SCREWS THAT HOLD THE TOP WING TO THE CABANES AND TIGHTEN. INSTALL THE DIAGONAL BRACES USING THE FOUR 6-32x1/2" SOCKET HEAD CAP SCREWS AND 6-32 AIRCRAFT LOCK NUTS. AFTER THESE ARE TIGHT REMOVE THE SCREWS HOLDING THE STRUTS TO THE FUSELAGE ONE AT A TIME AND APPLY THREAD LOCKER. REINSTALL AND TIGHTEN. THIS SEQUENCE OF INSTALL AND TIGHTENING THE BOLTS WILL MAKE SURE THAT THE STRUTS ARE ALIGNED AND NOT UNDER STRESS.

FIT THE I-STRUTS IN PLACE PAYING ATTENTION TO LEFT AND RIGHT AND TOP AND BOTTOM. THE I-STRUTS HAVE RECESSES IN THEM THAT FIT OVER THE TABS IN THE WINGS. INSTALL THE FOUR 6-32x3/4" SOCKET HEAD CAP SCREWS IN EACH STRUT.



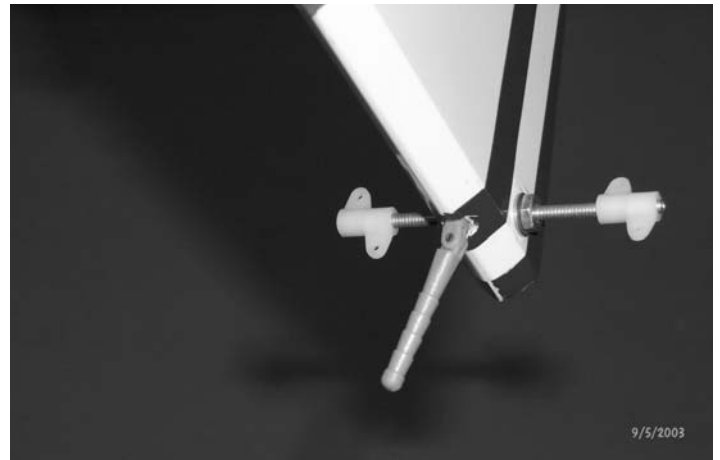
CONTROL SURFACES

LOCATE THE PREDRILLED HOLE FOR THE AILERON, ELEVATOR, AND RUDDER HORNS. OPEN THE HOLE UP WITH A 9/64" DRILL. LOCATE THE 6-32 X 2" FLAT HEAD SCREWS, #6 WASHERS, AND 6-32 NUTS.

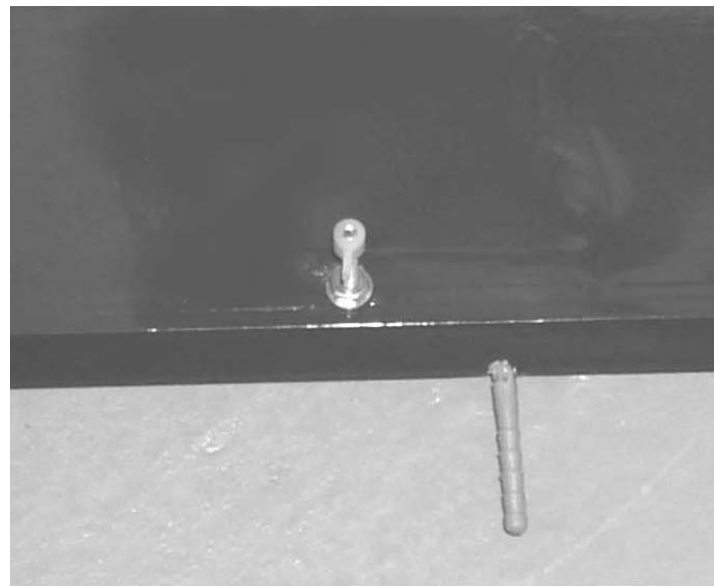


INSTALL THE 6-32 BOLT THROUGH THE ELEVATOR AND SECURE WITH A FLAT WASHER AND NUT. PUT A DROP OF CA ON THE NUT TO MAKE SURE IT DOES COME LOOSE. INSTALL THE HORN BRACKET FLUSH WITH THE END OF THE BOLT.

ALL SURFACES ARE DRILLED TO ACCEPT THE LARGE HINGE POINTS. TO ENSURE THE PROPER ALIGNMENT OF THE HINGES, FIRST APPLY PETROLEUM JELLY TO THE PIVOT POINTS AND THEN PUT 30-MINUTE EPOXY INTO THE HOLES DRILLED IN THE STAB AND THE ELEVATOR. PUT A LITTLE ON BOTH TIPS OF THE HINGE POINT AND INSERT THE HINGE INTO THE STAB AND ELEVATOR WHILE FLEXING THE SURFACE UP AND DOWN AND SLIDING IT INTO PLACE. THIS CAUSES THE HINGE POINTS TO ROTATE INTO PERFECT ALIGNMENT.



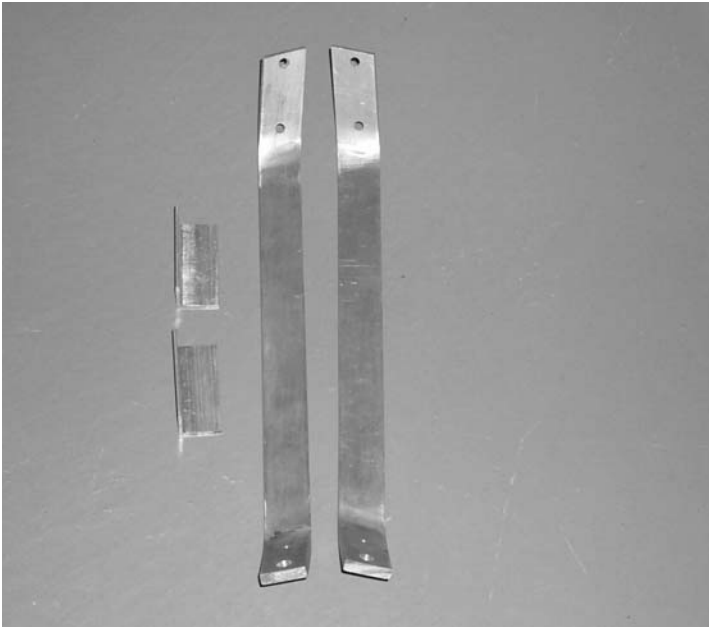
THE RUDDER HORN IS A 3" LONG 6-32 THREADED ROD. INSTALL WITH A FLAT WASHER AND NUT ON EACH SIDE. USE CA ON THE NUTS. INSTALL TWO HORN BRACKETS ON EACH SIDE. ONE FACES FORWARD FOR THE RUDDER, THE OTHER FACES REARWARD FOR THE TAIL WHEEL. HINGE THE RUDDER TO THE FIN USING THE SAME METHOD AS THE ELEVATOR HINGES.



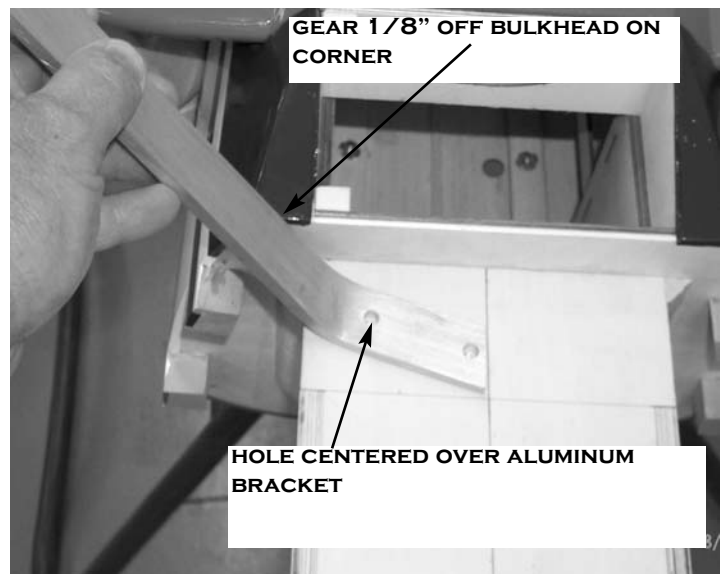
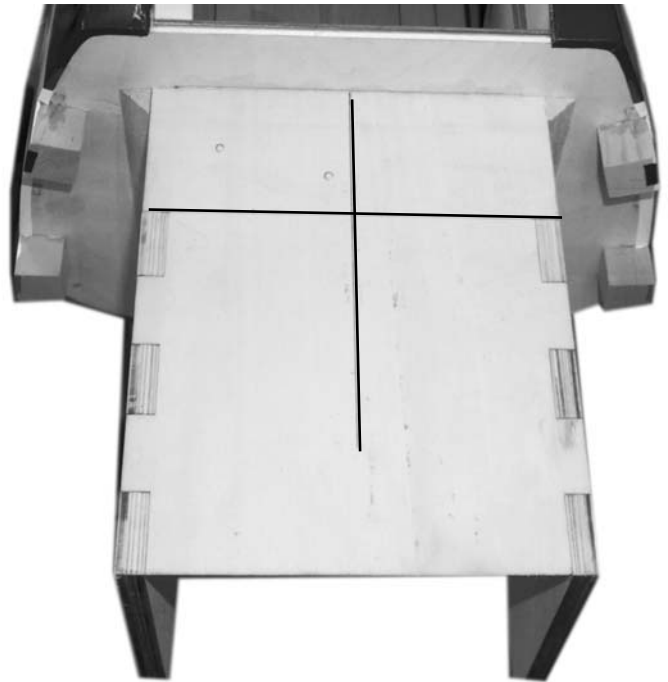
THE AILERONS USE THE SAME 6-32 X 2" BOLT, WASHERS, AND NUTS AS THE ELEVATORS. INSTALL THE HORN BRACKETS AND HINGE ALL FOUR AILERONS USING THE SAME METHOD AS THE ELEVATORS.

LANDING GEAR

TURN THE PLANE UPSIDE DOWN AND DRAW A LINE DOWN THE CENTER OF THE MOTOR BOX AND ALONG THE FRONT EDGE OF THE GEAR PLATE

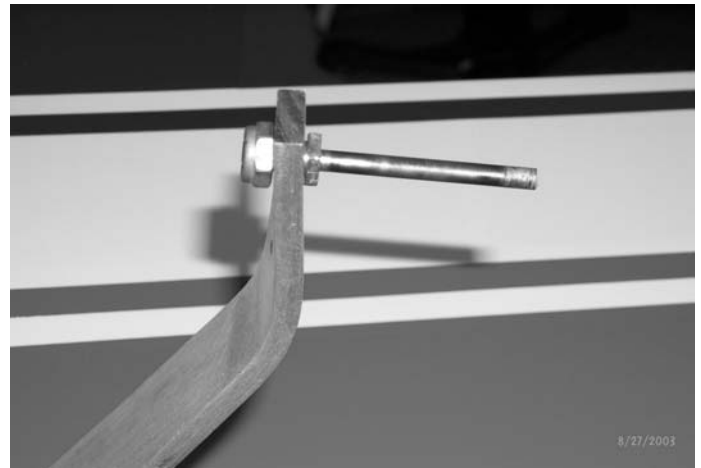


LOCATE THE TWO LANDING GEAR LEGS AND THE TWO 1" ALUMINUM ANGLES. USING FOUR 6-32x3/4" SOCKET HEAD CAP SCREWS, FOUR #6 WASHERS, AND FOUR 6-32 NUTS, MOUNT THE ALUMINUM ANGLES FLUSH AGAINST THE LANDING GEAR PLATE AND THE MOTOR BOX SIDES. DRILL TWO 9/64" HOLES ON EACH SIDE THROUGH THE MOTOR BOX SIDES AND CENTERED UP ON THE ALUMINUM BRACKET. IT MAY BE NECESSARY TO REMOVE GLUE BUILD UP IN THE CORNER AND FILE THE SHARP EDGE OFF THE CORNER OF THE ALUMINUM BRACKET TO MAKE IT FIT FLUSH.

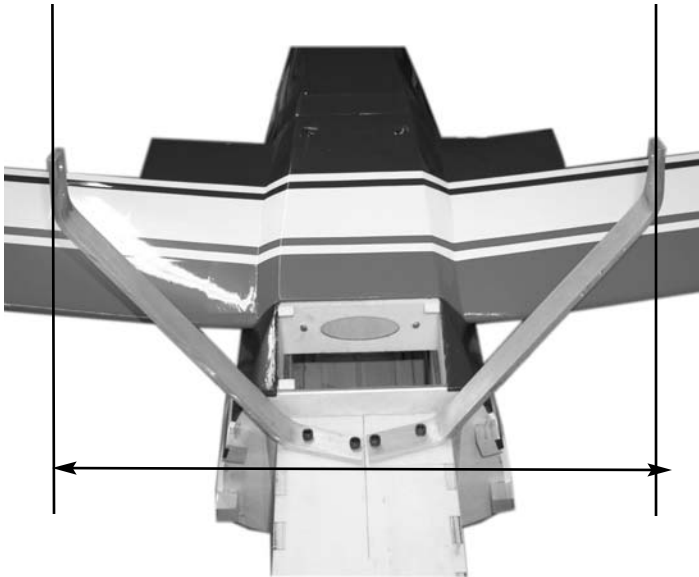


30% ULTIMATE ARF

ALIGN THE GEAR SO THE OUTSIDE HOLE WILL GO THROUGH THE CENTER OF THE ALUMINUM BRACKET. ALIGN THE INSIDE EDGE OF THE GEAR PARALLEL TO THE CENTER LINE. IT WILL BE APPROXIMATELY 1/8" OUTSIDE THE LINE, DON'T WORRY ABOUT THE SPACING. THE GEAR SHOULD BE APPROXIMATELY 1/8" OFF THE BULKHEAD AT THE REAR. MARK AND DRILL THE OUTSIDE HOLE. INSTALL THE 1/4-20 X 1-1/2" SOCKET HEAD CAP SCREW AND SECURE ON THE INSIDE WITH A FLAT WASHER AND AIRCRAFT LOCK NUT. JUST SNUG THE NUT UP AT THIS TIME. DO NOT DRILL THE INSIDE HOLE YET. INSTALL THE OTHER GEAR IN THE SAME MANNER.



INSTALL THE AXLES ON THE GEAR LEGS. BE CAREFUL AND DON'T OVER TIGHTEN THE NUTS. IT LOOKS LIKE A BIG BOLT BUT THE CENTER IS DRILLED OUT TO ACCEPT THE AXLE AND CAN BE OVER TIGHTENED EASILY.



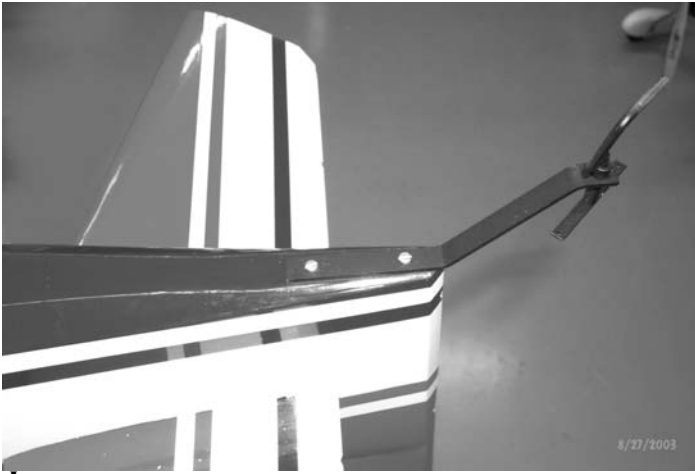
FLAT PART OF GEAR LEG MUST BE PARALLEL TO CENTER LINE OF AIRPLANE.

CHECK THAT THE FLAT PART OF THE GEAR LEG IS PARALLEL TO THE CENTER LINE OF THE PLANE. YOU CAN MOVE THE GEAR BY LETTING IT PIVOT ON THE ONE BOLT. WHEN THE GEAR IS ALIGNED, DRILL THE OTHER BOLT HOLE AND INSTALL THE BOLT, WASHER AND NUT AND TIGHTEN. YOU CAN NOW FINISH TIGHTENING THE OTHER BOLT.

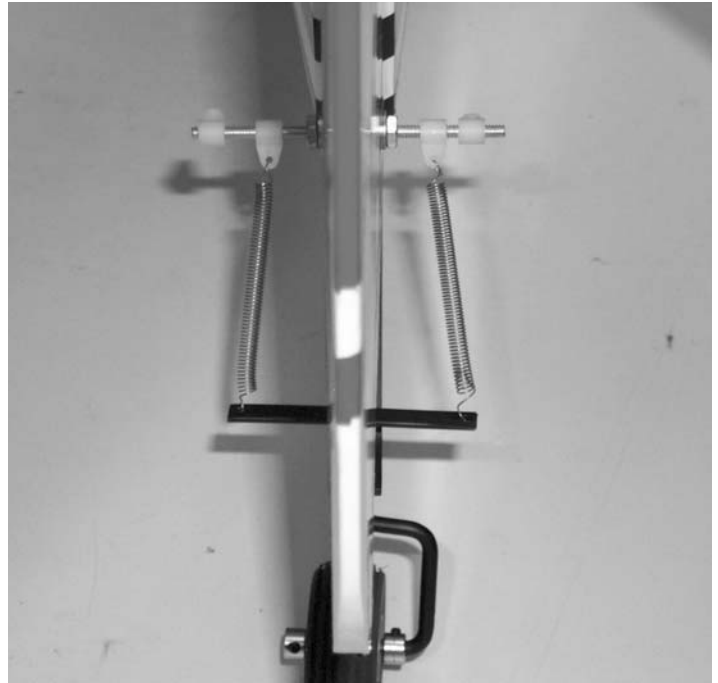


LOCATE THE TAIL WHEEL SPRING AND CUT INTO TWO EQUAL PIECES. BEND A LOOP INTO EACH END.

30% ULTIMATE ARF



LOCATE THE TAIL WHEEL BRACKET AND ALIGN THE BEND IN THE STRUT AT THE REAR OF THE FUSELAGE. CENTER THE MOUNT ON THE FUSELAGE AND DRILL TWO 5/64" HOLES AT THE HOLE LOCATION. HARDEN THE HOLES BY USING A COUPLE OF DROPS OF THIN CA IN EACH HOLE. MOUNT THE TAIL WHEEL BRACKET USING THE TWO #6x3/4" PAN HEAD SCREWS.

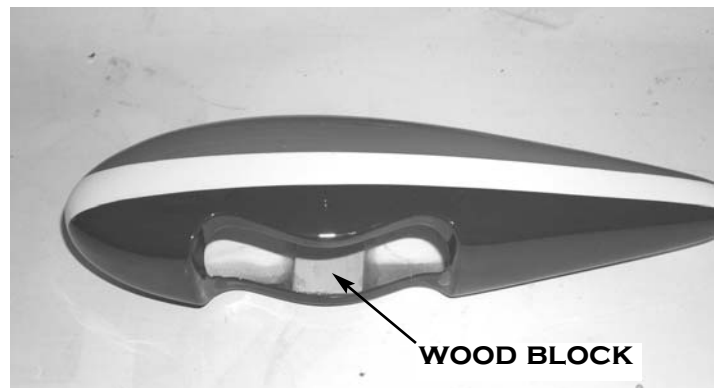


ATTACH THE TAIL WHEEL STEERING SPRINGS TO THE HORN BRACKETS ON THE RUDDER HORN AND THE TILLER ARM ON THE TAIL WHEEL BRACKET.



INSTALL THE TAIL WHEEL WITH A WHEEL COLLAR ON BOTH SIDES.

WHEEL PANTS

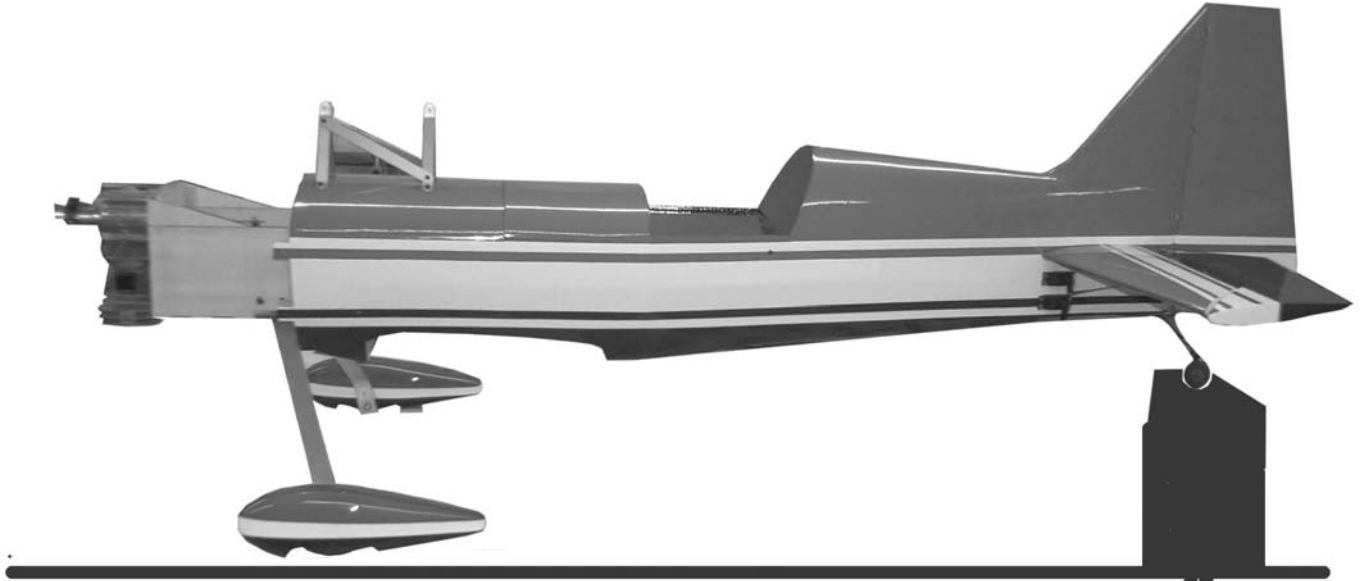


LOCATE THE WHEEL PANTS AND IDENTIFY THE LEFT AND RIGHT. THE WOOD MOUNT BLOCK WILL BE ON THE INSIDE PORTION OF THE WHEEL PANT. LEFT WHEEL PANT SHOWN.

30% ULTIMATE ARF



DRILL A 1/2" HOLE AT THE DIMPLE ON THE SIDE WITH THE WOOD BLOCK. IF YOU HAVE A FORSTNER BIT YOU CAN DRILL THE 1/2" HOLE DIRECTLY, IF USING A REGULAR DRILL START WITH A SMALL BIT AND WORK YOUR WAY UP SLOWLY OR GRIND OUT WITH A DREMEL TOO TO PREVENT DAMAGING THE FIBERGLASS. SUPPORT THE WOOD BLOCK ON THE INSIDE WHEN DRILLING TO PREVENT KNOCKING THE BLOCK LOOSE. IF THIS HAPPENS JUST EPOXY BACK INTO PLACE.

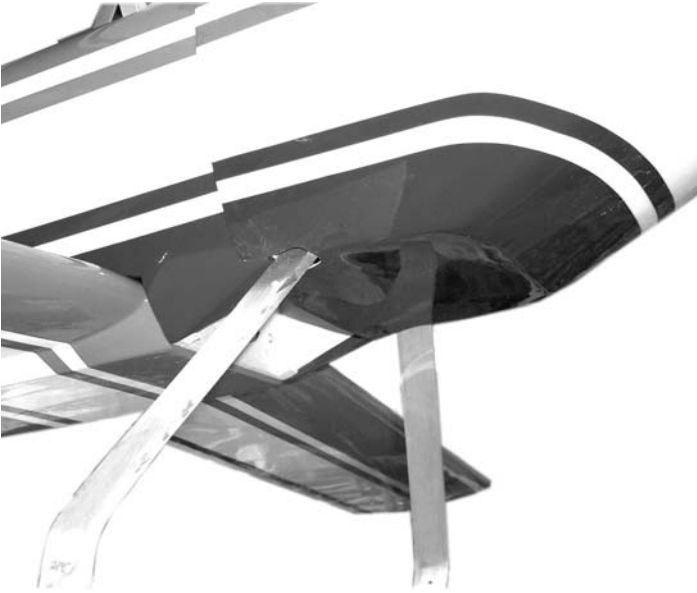


BLOCK THE FUSELAGE UP LEVEL ON YOUR WORK BENCH AND FIT THE WHEEL PANTS ON THE AXLES WITH OUT THE WHEELS. THE 1/2" HOLE WILL FIT OVER THE NUT PART OF THE AXLE AT THE LANDING GEAR. BLOCK THE WHEEL PANTS UP SO THEY ARE LEVEL AND PARALLEL TO EACH OTHER.



TAKE A 1/8" DRILL AND MARK THE LOCATION OF THE HOLE THROUGH THE PRE-DRILLED HOLE IN THE LANDING GEAR. REMOVE THE WHEEL PANT AND DRILL A 3/16" HOLE ON THE MARK. INSTALL THE BLIND NUT BY PULLING IT INTO PLACE WITH THE 6-32 X 1/2" SOCKET HEAD SCREW WITH A WASHER ON THE OUTSIDE. WHEN THE NUT IS SEATED GLUE IN PLACE WITH CA BEING CAREFUL NOT TO GET GLUE IN THE THREADS. PUT A 3/16" WHEEL COLLAR ON THE AXLE, PUT THE WHEEL PANT HALF WAY ON AND SLIP THE FOUR INCH WHEEL ON THE AXLE. INSTALL THE OUTSIDE WHEEL COLLAR AND ADJUST BOTH SO THE WHEEL IS CENTERED IN THE WHEEL PANT. ROTATE THE WHEEL PANT INTO PLACE AND SECURE WITH THE 6-32 X 1/2" SCREW. BE SURE AND USE THREAD LOCK ON THE SCREW.

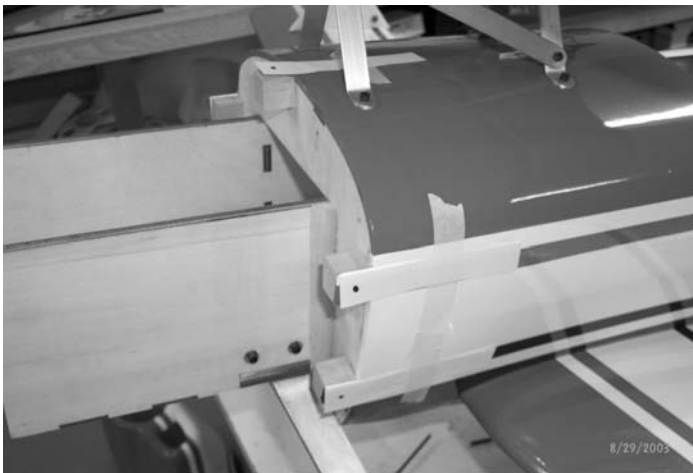
COWL MOUNTING



SLIDE THE COWL INTO PLACE AND MARK THE LOCATION OF THE LANDING GEAR ON THE BOTTOM. USING A DREMEL TOOL, CUT SLOTS IN THE COWL TO FIT AROUND THE LANDING GEAR. THE COWL SHOULD OVERLAP THE FUSELAGE 1/2".

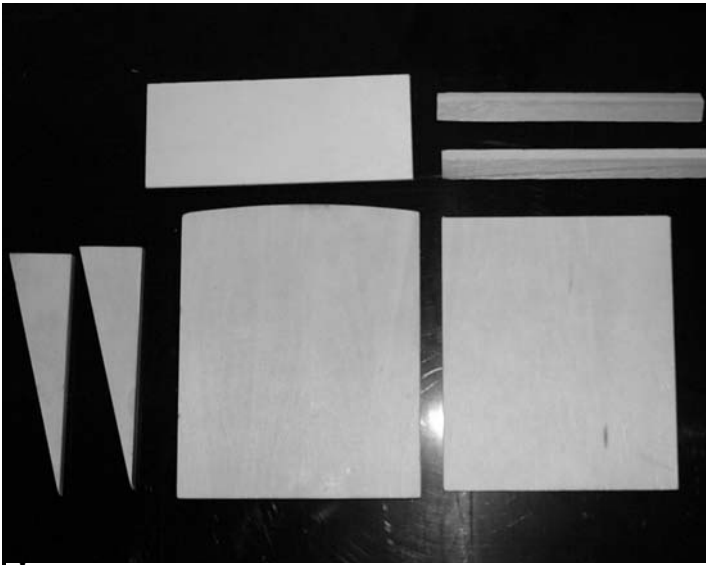


SLIDE THE COWL INTO POSITION OVERLAPPING THE FUSELAGE 1/2". USE MASKING TAPE TO HOLD IN PLACE. MAKE SURE THE STRIPES ARE ALIGNED ON EACH SIDE. LET THE STRIPS OF PAPER BE ON THE OUT SIDE OF THE COWL. USE A STRAIGHT EDGE AND ALIGN THE TOP OF THE COWL WITH THE TOP OF THE FUSELAGE. MAKE SURE STRIPES ARE STRAIGHT FROM FUSELAGE TO COWL ON EACH SIDE. CHECK THE LEFT AND RIGHT ALIGNMENT TO MAKE SURE IT IS STRAIGHT WITH THE CENTER LINE OF THE FUSELAGE. WHEN SATISFIED WITH THE ALIGNMENT, USE THE MARK ON THE STRIP OF PAPER TO LOCATE THE MOUNTING HOLES IN THE COWL. DRILL A 1/16" HOLE THROUGH THE PAPER, COWL, AND INTO THE MOUNTING BLOCK. OPEN THE HOLE IN THE COWL UP TO 9/64" AND INSTALL A #6x1/2" SHEET METAL SCREW WITH A #6 WASHER. DO THIS IN 5 PLACES. MAKE SURE FIREWALL IS NOT TOUCHING THE COWL ON TOP.



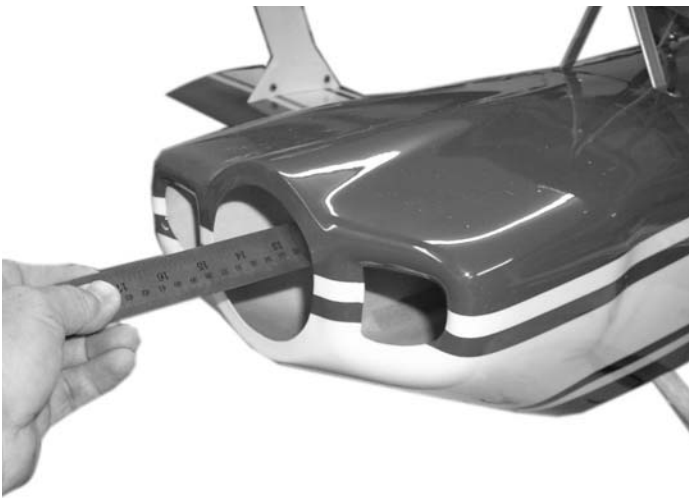
CUT 5 STRIPS OF HEAVY PAPER 3/4" WIDE AND TAPE IN POSITION ON THE FUSELAGE SO ONE END IS FLUSH WITH THE COWL MOUNT BLOCKS. MAKE A MARK OVER THE CENTER OF THE COWL MOUNT BLOCK.

ENGINE MOUNTING

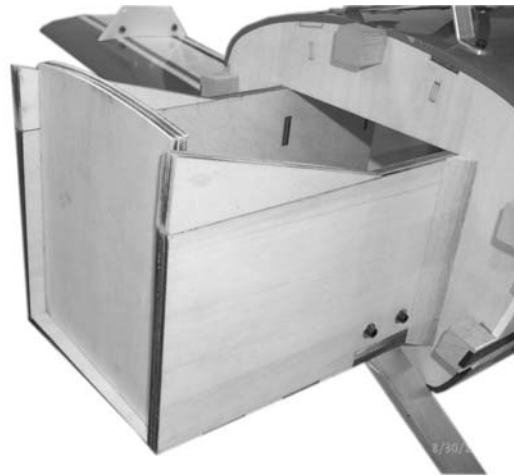


LOCATE THE FIREWALL, MOTOR BOX COVERS, TRI STOCK, AND TOP FIREWALL SUPPORTS.

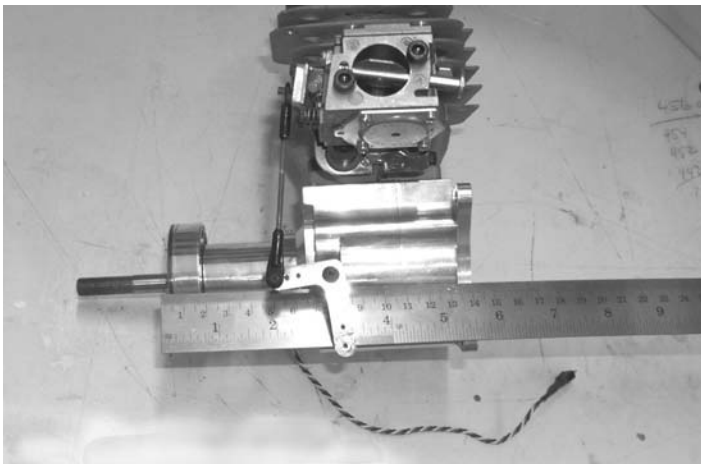
MEASURE THE ENGINE LENGTH FROM THE MOUNTING PLATE TO THE THRUST WASHER. SUBTRACT THIS NUMBER FROM THE LENGTH OF THE MEASUREMENT OF THE COWL FROM FORMER F1. THAT NUMBER IS WHERE YOU CUT THE MOTOR BOX SIDES. YOU WILL NEED TO ADD ABOUT $1/8$ " TO THE LENGTH OF THE MOTOR BOX SIDES FOR CLEARANCE BETWEEN THE THE SPINNER BACKPLATE AND THE COWL RING. ON MOST ENGINES THE CYLINDER WILL BE BEHIND THE ENGINE MOUNT AT THE BOTTOM AND WILL HIT THE FIREWALL IF THE FIREWALL IS NOT NOTCHED OUT.

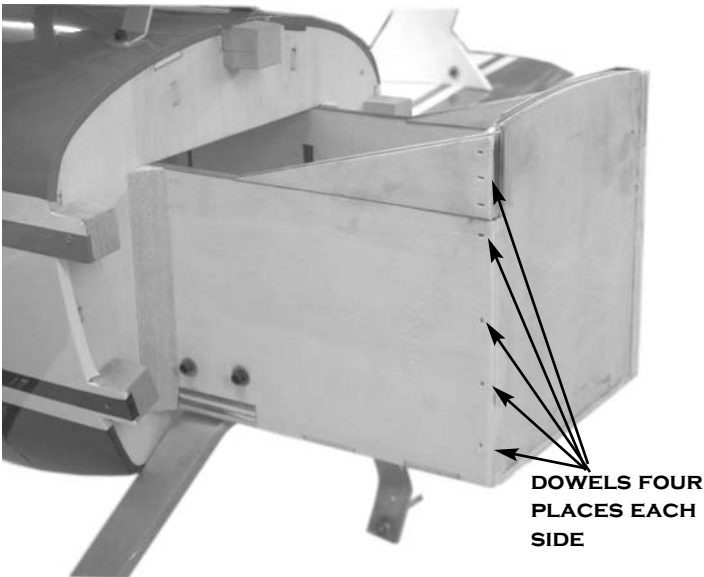


WITH THE COWL MOUNTED, MEASURE FROM THE F1 FORMER TO THE FRONT OF THE COWL RING. WRITE THIS NUMBER DOWN.

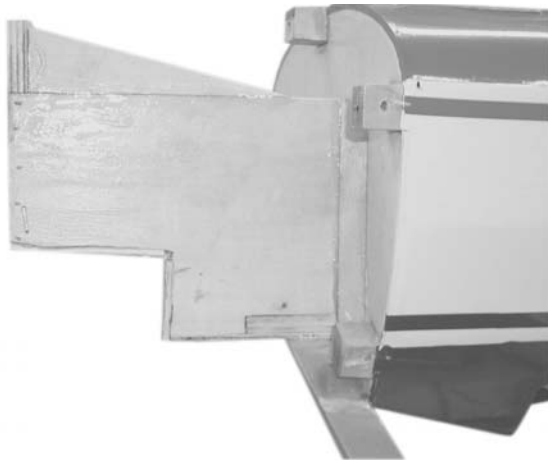


USE A SQUARE TO DRAW A LINE ON THE MOTOR BOX SIDES. BE SURE AND KEEP IT SQUARE TO THE BOX SIDES AS THIS WILL ADJUST THE UP AND DOWN THRUST. MARK THE LEFT SIDE $3/16$ " LONGER THAN THE RIGHT TO GIVE THE DESIRED RIGHT THRUST.





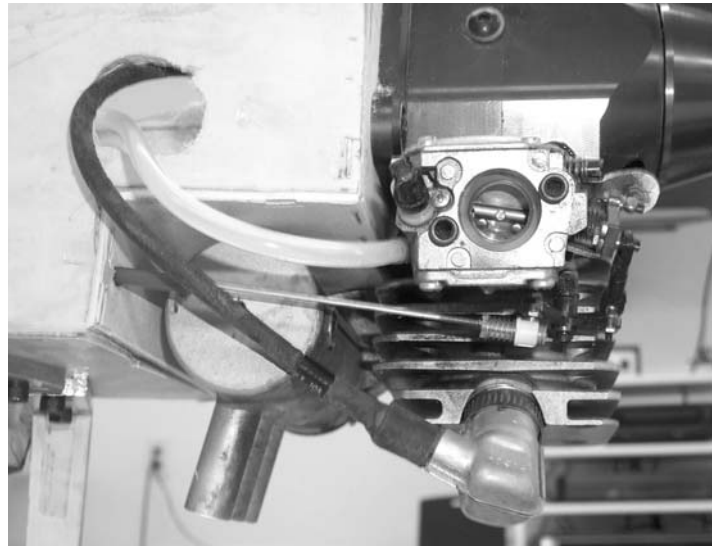
EPOXY THE FIREWALL IN PLACE MAKING SURE TO KEEP IT SQUARE WITH THE SIDES. ADD THE TRIANGLE TOP SUPPORTS ON BOTH SIDES AND THE TRI STOCK ON THE BACK SIDE. DRILL 1/8" HOLES 1" DEEP IN FIVE PLACES ON EACH SIDE OF THE MOTOR BOX AND PIN THE FIREWALL USING 1/8" DOWELS AND GLUE.



YOU WILL PROBABLY NEED TO NOTCH THE FIREWALL TO CLEAR THE CYLINDER HEAD. IF YOU PLAN TO USE A PITTS STYLE MUFFLER YOU WILL HAVE TO NOTCH THE BOTTOM OF THE FIREWALL. JUST CUT THE FIREWALL AND MOTOR BOX SIDES TO ACCEPT THE MUFFLER AND THEN BOX THE AREA BACK IN WITH 1/8" PLYWOOD WITH TRI STOCK ON THE INSIDE.



ATTACH THE MOTOR BOX TOP COVERS USING THE 10 #4x1/2" SCREWS AND #4 WASHERS.



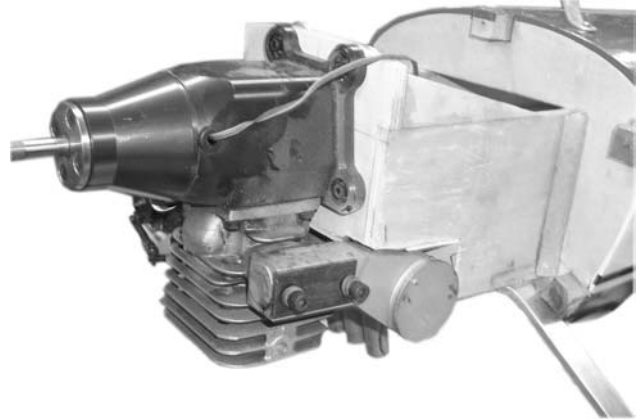
YOU CAN CUT A HOLE IN THE MOTOR BOX SIDE TO PASS THE SPARK PLUG LEAD AND FUEL LINE THROUGH TO THE ENGINE.

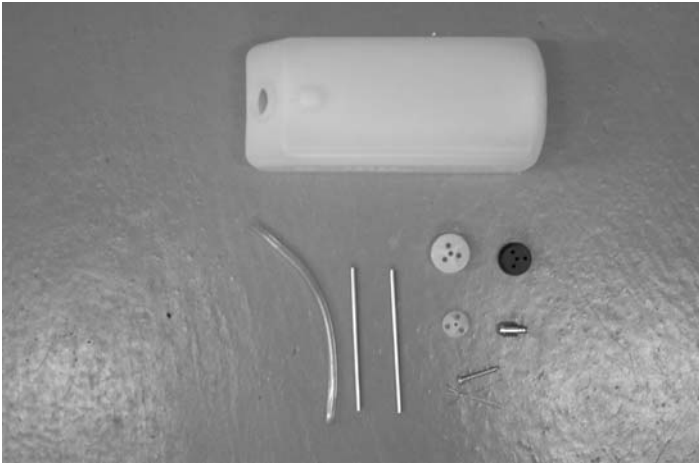
30% ULTIMATE ARF



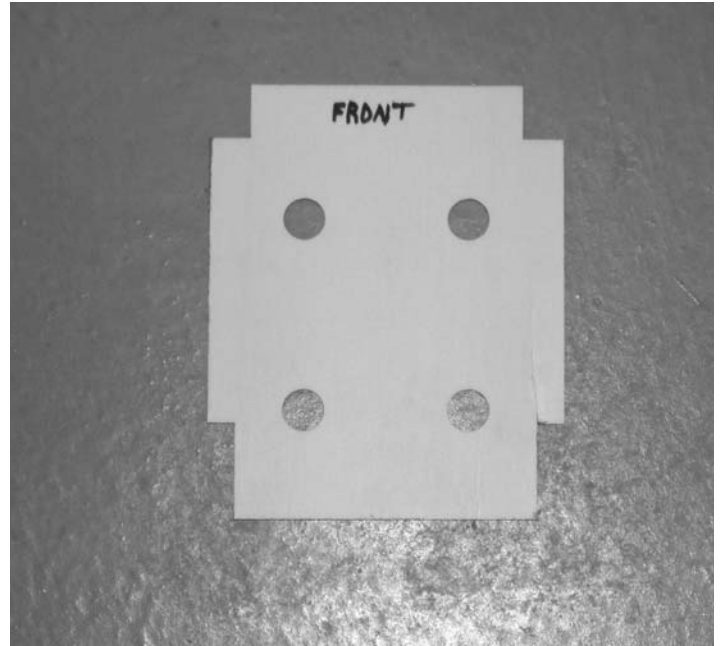
SHIM THE ENGINE OUT IF NECESSARY TO GET APPROXIMATELY 1/8" CLEARANCE. MOVE THE ENGINE LEFT OR RIGHT AND UP AND DOWN TILL THE SPINNER BACK PLATE MATCHES THE COWL. WHEN SATISFIED WITH THE FIT, USE A LONG DRILL TO DRILL THE MOTOR MOUNT HOLES. REMOVE THE DRY WALL SCREWS ONE AT A TIME AND DRILL AND INSTALL THE MOTOR MOUNT BOLTS.

MEASURE THE FIREWALL AND DRAW A LINE DOWN THE CENTER. OFF SET THIS LINE 1/8" TO THE LEFT SIDE OF THE PLANE. MEASURE UP 4-1/2" FROM THE BOTTOM OF THE FIREWALL AND DRAW A LINE ACROSS THE FIREWALL. CENTER THE ENGINE UP ON THE TWO LINES. THE BEST WAY TO GET THE ENGINE PERFECTLY ALIGNED WITH THE COWL IS TO ATTACH THE ENGINE TO THE FIREWALL WITH #6x3/4" DRY WALL SCREWS. YOU DON'T HAVE TO DRILL A PILOT HOLE, JUST PUT ONE IN THE TOP AND ONE IN THE BOTTOM. THEY MAKE SUCH A SMALL HOLE THAT YOU CAN MOVE THE ENGINE SLIGHTLY AND PUT ANOTHER ONE IN. INSTALL THE COWL MAKING THE CUTOUTS FOR THE CYLINDER HEAD AND MUFFLER AND CHECK THE FIT OF THE COWL TO THE SPINNER BACK PLATE.

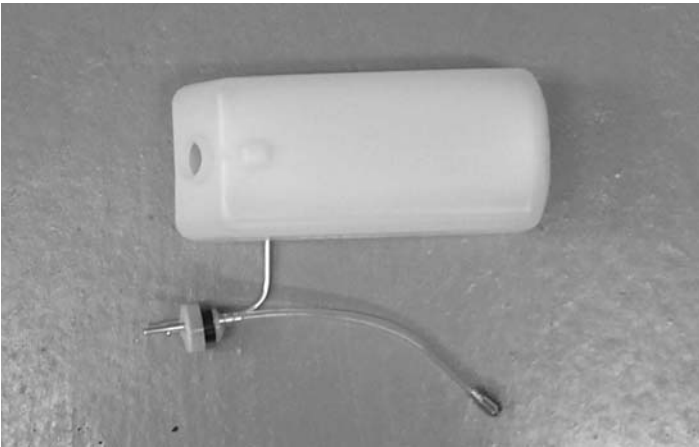




LOCATE THE FUEL TANK AND HARDWARE.



THERE IS A LASER CUT TANK MOUNT FURNISHED WITH THE PLANE. IT IS MARKED FRONT.



ASSEMBLE THE TANK WITH THREE LINES. TAKE ONE OF THE PIECES OF BRASS TUBE AND CUT INTO TWO EQUAL LENGTHS. BEND THE OTHER TUBE SO IT WILL GO TO THE TOP OF THE TANK AND FIT INTO THE RAISED PORTION OF THE TANK. THE OTHER TWO TUBES WILL JUST EXTEND PAST THE CAP ON BOTH ENDS. CONNECT THE PICKUP TUBE AND CLUNK TO ONE TUBE. AFTER THE TANK IS INSTALLED, THE VENT LINE (TUBE TO TOP OF TANK) CAN BE PLUMBED OUT THE BOTTOM OF THE FUSELAGE JUST IN FRONT OF THE LANDING GEAR. THE PICKUP LINE (TUBE WITH LINE AND CLUNK) CAN BE ROUTED TO THE CARBURETOR, AND THE FILL LINE CAN BE ROUTED TO A FILLER VALVE, FUEL DOT OR JUST ROUTED OUT THE BOTTOM OF THE FUSELAGE. THE FILL LINE WILL HAVE TO BE PLUGGED TO PREVENT FUEL FROM RUNNING OUT, THE VENT LINE MUST BE LEFT OPEN.



TIP THE PLATE ON EDGE AND IT WILL FIT IN THE CUT OUT IN THE MOTOR BOX SIDES. GLUE IN PLACE. THIS WILL PLACE THE TANK OVER THE CG OF THE PLANE.

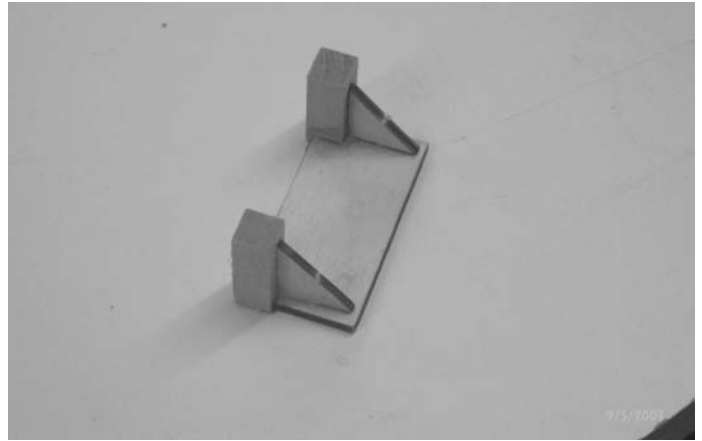


PLACE THE TANK BETWEEN THE HOLES AND USE THE TWO 14" TIE WRAPS TO SECURE THE TANK TO THE MOUNT.

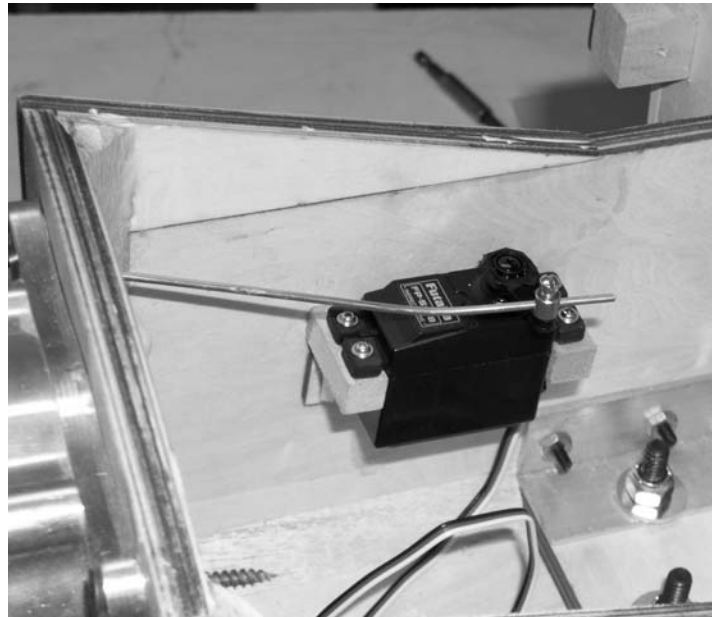
SERVO MOUNTING



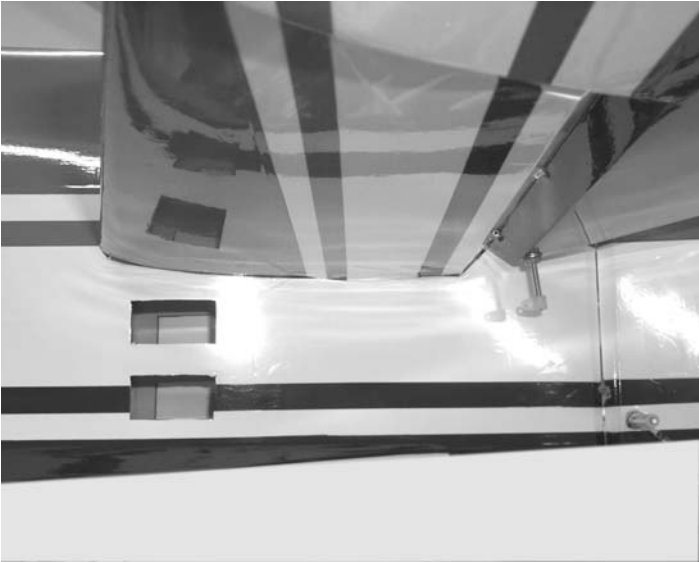
LOCATE THE 2-56x10" THROTTLE PUSHROD AND NYLON SNAP LINK. DRILL A HOLE IN THE FIREWALL IN LINE WITH YOUR THROTTLE ARM AND CONNECT PUSHROD.



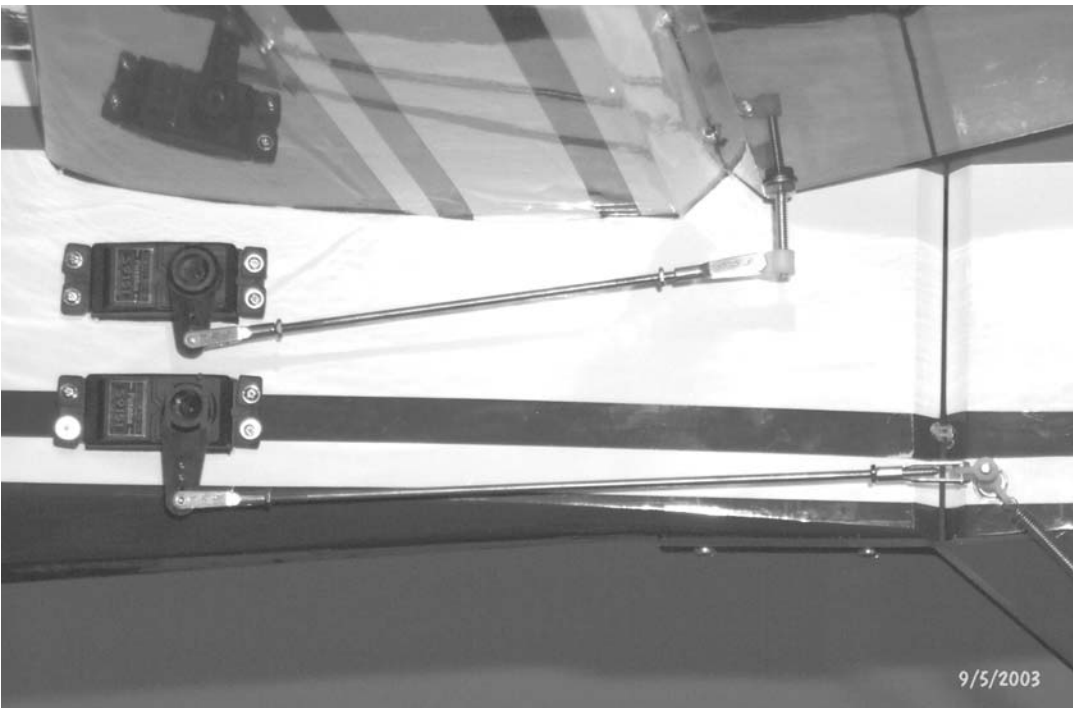
LOCATE THE LASER CUT THROTTLE SERVO MOUNT AND THE TWO 3/8" x1" BASS WOOD BLOCKS. EPOXY THE BLOCKS TO THE PLATE WITH THE TRIANGLES UNDERNEATH.



EPOXY THE SERVO MOUNT TO THE MOTOR BOX SIDE IN THE PROPER POSITION TO LINE UP WITH YOUR THROTTLE ARM. PUT THE E-Z CONNECTOR ON THE OUTPUT ARM OF THE SERVO AND CONNECT THE 2-56 PUSH ROD.

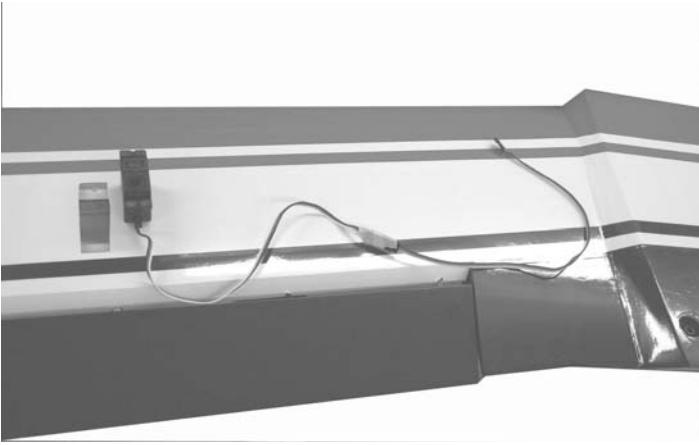


LOCATE THE TWO SERVO CUTOUTS ON EACH SIDE OF THE FUSELAGE JUST UNDER THE STAB. REMOVE THE COVERING WITH A SHARP KNIFE.

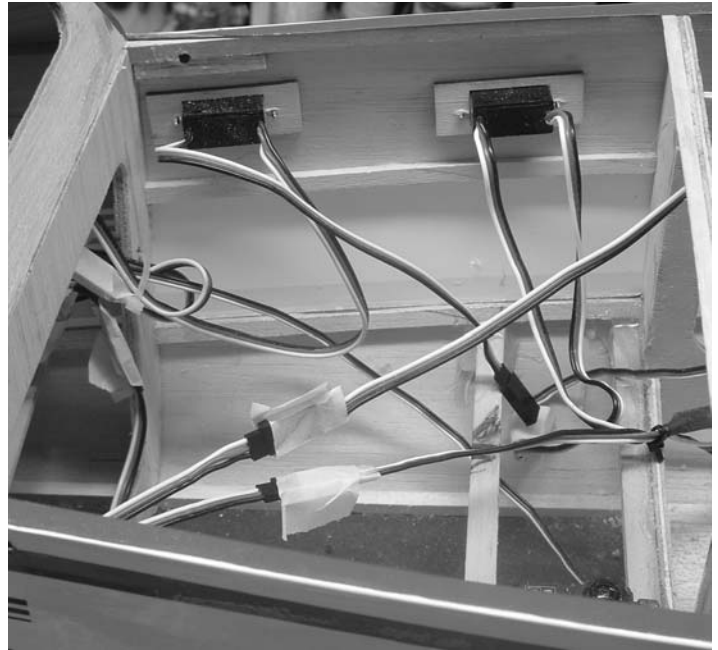


INSTALL THE TWO SERVOS WITH THE OUTPUT SHAFT TO THE REAR. YOU WILL NEED FOUR 24" SERVO LEAD EXTENSIONS. LOCATE THE TWO 4-40 X 5" PUSHRODS, FOUR 4-40 NUTS, FOUR 4-40 GOLDEN CLEVISES, AND FOUR CLEVIS RETAINER CLIPS. INSTALL A NUT AND CLEVIS ON EACH END AND WITH THE SERVO CENTERED, CONNECT TO SERVO AND ELEVATOR HORN.

LOCATE THE TWO 7" 4-40 PUSHRODS AND INSTALL NUTS AND CLEVISES ON EACH END. ATTACH TO RUDDER OUTPUT AND RUDDER HORN. AFTER CONTROLS ARE ADJUSTED INSTALL THE CLEVIS RETAINER CLIPS ON ALL CLEVISES. TIGHTEN THE NUTS AGAINST THE CLEVISES.

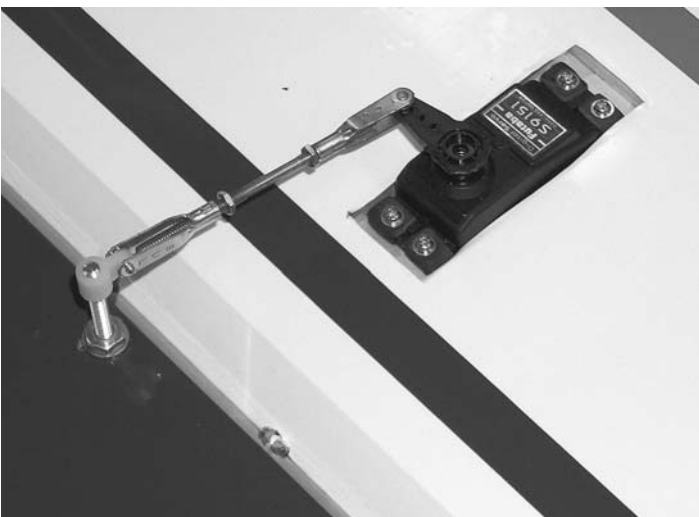


LOCATE THE FOUR AILERON SERVO CUTOUTS IN THE BOTTOM SIDE OF BOTH WINGS. REMOVE THE COVERING WITH A SHARP KNIFE. YOU WILL NEED FOUR 14" SERVO LEAD EXTENSIONS. THERE IS A STRING LOCATED IN EACH CUTOUT TO PULL THE WIRE THROUGH TO THE CENTER SECTION. LOCATE THE TWO 3/4" HOLES IN THE TOP SIDE OF THE BOTTOM WING IN THE CENTER AND THE BOTTOM OF THE TOP WING IN THE CENTER. REMOVE THE COVERING OVER THESE HOLES. ATTACH THE STRING YOU YOUR SERVO LEAD AND PULL THROUGH WING. MOUNT THE SERVO WITH THE HARDWARE SUPPLIED WITH THE RADIO WITH THE OUTPUT ARM TO THE REAR.



LOCATE THE TWO SWITCHES, ONE RADIO ONE MOTOR, JUST BELOW THE HATCH RAIL JUST IN FRONT OF THE TURTLEDECK BULKHEAD ON ONE SIDE. YOU CAN GLUE A COUPLE OF RAILS (NOT SUPPLIED) ACROSS THE FUSELAGE IN THIS AREA TO MOUNT THE RECEIVER AND TWO BATTERIES ON. THE CG WILL PROBABLY REQUIRE THIS AREA TO BE USED. YOU WILL NEED AN 18" SERVO LEAD EXTENSION TO REACH THE THROTTLE SERVO, A Y-CONNECTOR TO PLUG IN THE TWO RUDDER SERVOS, TWO Y-CONNECTORS TO PLUG IN THE AILERONS, PLUS TWO 12" EXTENSIONS. IF YOU HAVE A COMPUTER RADIO YOU CAN PLUG THE ELEVATOR SERVOS INTO DIFFERENT CHANNELS, IF NOT YOU WILL NEED A SERVO REVERSER.

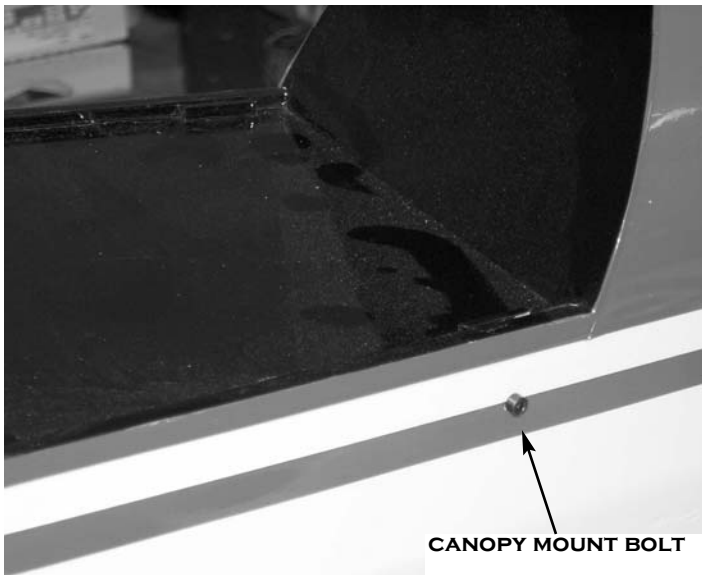
THERE IS A HOLE IN THE BALSA JUST INSIDE THE RIGHT REAR CABANE STRUT. YOU CAN REMOVE THE COVERING AND PASS THE Y-CONNECTOR THROUGH. CABLE TIE THE Y-CONNECTOR TO THE CABANE STRUTS SO THE TWO ENDS ARE AT THE TOP WHERE THE LEADS COME OUT OF THE TOP WING.



LOCATE THE TWO 4-40 x 2-1/8" PUSHRODS, CLEVISES, NUTS, AND RETAINERS. ATTACH THE PUSHROD BETWEEN SERVO ARM AND AILERON CONTROL HORN. AFTER CONTROLS ARE ADJUSTED TIGHTEN THE NUTS AGAINST THE CLEVIS AND INSTALL RETAINERS.



TRIM THE CLEAR CANOPY TO FIT HATCH. INSTALL PILOT(NOT SUPPLIED) IF DESIRED. CANOPY SHOULD FIT FLUSH WITH THE TURTLEDECK BULKHEAD AT THE REAR AND THE CANOPY FRAME AT THE BOTTOM. DO NOT GLUE CANOPY ON WITH FRAME OFF PLANE.



USE A PIN THROUGH THE HOLES INSIDE THE FUSELAGE TO LOCATE THE CANOPY MOUNT HOLE. REMOVE COVERING FROM HOLE AND ATTACH THE HATCH USING THE TWO 6-32 X 1" SOCKET HEAD SCREWS. THE BLIND NUT ARE ALREADY INSTALLED IN THE HATCH.



WITH HATCH BOLTED IN PLACE, PUT WAX PAPER BETWEEN THE TURTLE DECK AND HATCH AND BETWEEN BOTTOM OF HATCH AND FUSELAGE SIDE TO PREVENT GLUING HATCH TO FUSELAGE. IF YOU DO NOT HAVE THE HATCH BOLTED IN PLACE WHEN GLUING THE CANOPY ON, IT IS VERY EASY TO WARP THE HATCH WITH THE CANOPY AND THEN IT WILL NOT FIT ON THE FUSELAGE.

FINAL SET UP

THE CG IS 7" BEHIND THE LEADING EDGE OF THE TOP WING MEASURED IN THE CENTER SECTION OF THE WING.

THE ELEVATOR THROW SHOULD BE SET AT 1" LOW RATE, 2-1/2" HIGH RATE, RUDDER 2" LOW RATE, 5" HIGH RATE, AND AILERONS 1/2" LOW RATE, 1-1/4" HIGH RATE.

THE CABANE STRUTS ATTACH TO THE TOP WING WITH 6-32 AIRCRAFT LOCK NUTS. THE I-STRUT BOLTS SHOULD BE ATTACHED USING LOW STRENGTH THREAD LOCK. REGULAR THREAD LOCK MAY BE TOO STRONG AND CAUSE THE BLIND NUT TO PULL OUT WHEN THE BOLTS ARE REMOVED. THE CANOPY SHOULD ALSO BE ATTACHED USING THE LOW STRENGTH THREAD LOCK. THE CABANE STRUTS SHOULD ALREADY HAVE REGULAR THREAD LOCK ON THE BOLTS WHERE THEY ARE ATTACHED TO THE FUSELAGE, IF NOT BE SURE AND THREAD LOCK THEM. THERE IS A LOT OF VIBRATION WITH A SINGLE CYLINDER GAS MOTOR AND CARE MUST BE TAKEN TO MAKE SURE ALL THE BOLTS STAY PUT. RUN THE ENGINE AND RANGE CHECK THE RADIO. RUN IT AT FULL THROTTLE TO CHECK THE VIBRATION AND

30% ULTIMATE ARF

MINUTES. SHUT THE ENGINE DOWN AND CHECK ALL YOUR BOLTS, CLEVISES, SERVOS AND LINKAGE. PULL THE WING OFF AND CHECK ALL THE ATTACH POINTS, JOINTS AROUND THE MOTOR BOX, WING HOLD DOWN BLOCK, FIREWALL, AND ANY OTHER JOINTS IN THE FUSELAGE. CHECK LINKAGE TO MAKE SURE THERE IS NO "SLOP" THAT CAN CAUSE FLUTTER. WHEN SATISFIED AT ALL IS SECURE GO FLY AND HAVE FUN. OUR MODELS HAVE FLOWN ON 4.2 CID ENGINES BOTH FOX AND PRECISION EAGLE USING THE SLIMLINE PITTS STYLE MUFFLER. YOU WILL NEED A 5" ULTIMATE STYLE SPINNER LIKE THE ONE SHOWN FROM TRU-TURN. WE HAVE FOUND THE 22-12 BOLLY PROP TO PERFORM VERY WELL ON THESE ENGINES. YOU SHOULD USE AT LEAST 1200MAH BATTERIES ON BOTH THE RADIO AND THE ENGINE. SERVOS SHOULD BE AT LEAST 70 OZ-IN OR BETTER. WE USED FUTABA 9151 DIGITAL SERVOS.